

REMARKS

Applicants respectfully request reconsideration of this application as amended.

Office Action Rejections Summary

Claims 1-4, 16-18, and 20-22 have been rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,878,112 of Koertge (“Koertge”).

Claims 5-12, 19 and 23-29 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Koertge in view of U.S. Patent No. 6,272,368 of Alexandrescu (“Alexandrescu”).

Claims 13-15 and 30 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Koertge in view of U.S. Patent No. 5,485,502 of Hinton et al. (“Hinton”).

Claims 6, 7, 13, 19 and 31 have been objected to because of informalities.

Claims 31-34 have been objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Status of Claims

Claims 1, 2, 3, 5-21, 31-33, and 35-75 are pending in the application. Claims 1, 2, 3, 5, 6, 8-13, 16, 19-21, 31, and 32 have been amended to more properly preexisting claim limitations. The amended claims are supported by the specification. Claims 35-75 have been added. No new matter has been added. Claims 4, 22-30, and 34 have been cancelled.

35 U.S.C. § 102(b) Rejections

Claims 1-4, 16-18, and 20-22 have been rejected under 35 U.S.C. §102(b) as being anticipated by Koertge. Applicants respectfully submit the cited reference does not anticipate claim 1.

As amended claim 1 recites:

A radiosurgery x-ray system, comprising:

an x-ray source having an emission head at a distal end of an arm assembly extending from a base unit; and

a collision avoidance subsystem coupled to the arm assembly, the collision avoidance subsystem comprising **means for preventing said head and arm assembly from effecting a collision with an object in one or more predetermined exclusion zones.**

(emphasis added).

In particular, the Office Action states:

As per claims 1-4, 16-18 and 20-22, Koertge discloses an X-ray system comprising an X-ray source (5) controller (9 – see also column 4, lines 34-38) and a collision avoidance subsystem (9) comprising means for preventing a head and arm assembly from effecting a collision with an object in one or more predetermined exclusion zones; wherein the subsystem comprises sensors and means responsive to an alarm signal to interrupt motion of an arm or head (Abstract; column 2, lines 29-45; see also column 4, lines 19-23, 50-63).

(Office Action, 4/18/05, p. 3).

Applicants submit that Koertge does not disclose, *inter alia*, a collision avoidance subsystem comprising means for preventing said head and arm assembly from effecting a collision with an object in one or more predetermined exclusion zones. Koertge discloses “a control device 9 containing an RBF neural network” that is “connected to the drives and sensors [that are] respectively connected to a plurality of adjustable components.”

(See Koertge, col. 2, lines 29-33). The control device 9 “**determines position information** relating to the adjustable components by gathering data of respective positions, respective directions of motion and respective speeds of movement of the components. These data are **gathered directly from the drives and sensors of said components** and are processed by a neural network internal to the control device, after the neural network has been trained in a learning phase. The results of the processing carried out by the neural network are then used to **control the components and thereby prevent collisions between the respective components.**” (See col. 2, lines 33-43)(emphasis added). As such, Koertge discloses a system that **prevents collisions between the respective components**, and not objects in one or more predetermined exclusions zones, by gathering positional information from the sensors of those respective adjustable components.

Moreover, Koertge limits its disclosure by stating that “[b]y arranging the inventive medical system in the manner prescribed, **direct monitoring of collisions with the patient, ... is omitted** from the neural network processing ... [and] as a practical matter, dispensing with this feature not only results in great savings in outlay and cost but also has relatively little practical significance. One reason for this is that **mutual collisions between components**, which often result in considerable damage, are substantially more probable than collisions with the patient.” (See col. 3, lines 18-30)(emphasis added). Accordingly, Koertge **explicitly states that it does not monitor collisions with the patient.**

In contrast, claim 1 recites “a collision avoidance subsystem coupled to the arm assembly, the collision avoidance subsystem comprising means for preventing said head and arm assembly from effecting a collision with an object in one or more predetermined exclusion zones.” Therefore, applicants respectfully submit that claim 1 is patentable over the cited reference.

Given that claims 2-3 depends from claim 1, applicants submit that claims 2-3 are also patentable over the cited reference.

Applicants respectfully submit the cited reference does not anticipate claim 5. As amended claim 5 recites:

A system, comprising:

an x-ray source having an emission head mounted at a distal end of an arm assembly to selectively emit an x-ray beam;

a collision avoidance subsystem coupled to the arm assembly to prevent the emission head and arm assembly from colliding with an object in one or more predetermined exclusion zones, the collision avoidance subsystem **comprising one or more optical emitter-receiver pairs** comprising:

an optical emitter including a light source for generating a substantially planar light beam between at least one predetermined exclusion zones and the x-ray source; and

an optical receiver for receiving back-scattered light from an object extending through the substantially planar light beam.

(emphasis added)

Nothing in Koertge discloses, teaches, or suggests, *inter alia*, a “collision avoidance subsystem comprising one or more optical emitter-receiver pairs,” as recited in claim 5. Therefore, applicants respectfully submit that claim 5 is patentable over the cited reference.

Given that claims 6-12, 19, and 35-41 depend from claim 5, applicants submit that claims 6-12, 19, and 35-41 are also patentable over the cited reference.

Applicants respectfully submit the cited reference does not anticipate claim 13.

As amended claim 13 recites:

A system, comprising:

an x-ray source having an emission head mounted at a distal end of an arm assembly to selectively emit an x-ray beam;

a collision avoidance subsystem coupled to the arm assembly to prevent the emission head and arm assembly from colliding with an object in one or more predetermined exclusion zones, wherein said collision avoidance subsystem comprises:

an array of acoustic transducers coupled to said x-ray source, wherein each of said transducers transmits a succession of acoustic pulses along a transmission axis extending from said x-ray source, detects acoustic energy back-scattered along said transmission axis from an object disposed along said transmission axis, and determines from said received back-scattered acoustic energy a distance between said x-ray source and said object, and wherein the transmission axis of each acoustic transducer is mutually aligned whereby a cross-section of adjacent pairs of said pulses transverse to said transmission axis is contiguous at a predetermined distance from said x-ray source.

(emphasis added)

Nothing in Koertge discloses, teaches, or suggests, *inter alia*, a “collision avoidance subsystem [comprising]: an array of acoustic transducers coupled to said x-ray source,” as recited in claim 13. Therefore, applicants respectfully submit that claim 13 is patentable over the cited reference.

Given that claims 14, 15, 31, and 42-45 depend from claim 13, applicants submit that claims 14, 15, 31, and 42-45 are also patentable over the cited reference.

Applicants respectfully submit the cited reference does not anticipate claim 16.

As amended claim 16 recites:

A system comprising:

an x-ray source having an emission head mounted at a distal end of an arm assembly to selectively emit an x-ray beam;

a collision avoidance subsystem coupled to the arm assembly to prevent the emission head and arm assembly from colliding with an object in one or more predetermined exclusion zones, wherein said collision avoidance subsystem comprises:

a sensor disposed on at least one of said arm assembly and said emission head, said sensor to generate an alarm signal upon impact of said sensor with an object during motion of the at least one of said arm assembly and said emission head; and wherein the collision avoidance subsystem interrupts motion of the at least one of said arm assembly and said emission head in response to said alarm signal.

(emphasis added)

Applicants submit that Koertge does not disclose, *inter alia*, “a sensor disposed on at least one of said arm assembly and said emission head, said sensor to generate an alarm signal upon impact of said sensor with an object during motion of the at least one of said arm assembly and said emission head.” Koertge discloses, as described above, a system that prevents collisions between respective components by gathering data of respective positions, directions, and speeds of the respective components and controlling the respective components using drives. (See col. 2, lines 33-43 and col. 4, lines 8-13 and 27-34). As such, Koertge merely discloses a system that **prevents collisions between the respective components, and not being operative to generate an alarm signal upon impact of said sensor with an object.**

In contrast, claim 16 recites “a sensor disposed on at least one of said arm assembly and said emission head, said sensor to generate an alarm signal *upon impact* of said sensor with an object during motion of the at least one of said arm assembly and said emission head.” Therefore, applicants respectfully submit that claim 16 is patentable over the cited reference.

Given that claims 17-18 and 46 depend from claim 16, applicants submit that claims 17-18 and 46 are also patentable over the cited reference.

Applicants respectfully submit the cited reference does not anticipate claim 20.

As amended claim 20 recites:

A radiosurgery x-ray system, comprising:

an x-ray source having an emission head at a distal end of an arm assembly extending from a base unit; and

a collision avoidance subsystem comprising means for preventing said head from entering one or more predetermined exclusion zones.

(emphasis added)

Koertge merely discloses a system that **prevents collisions between the respective components** by gathering positional information from the sensors of those respective adjustable components. Nothing in Koertge, however, discloses a “collision avoidance subsystem comprising means for **preventing said head from entering one or more predetermined exclusion zones**,” as recited in claim 20. Therefore, applicants respectfully submit that claim 20 is patentable over the cited reference.

Given that claim 21 depends from claim 20, applicants submit that claim 21 is also patentable over the cited reference.

Applicants respectfully submit the cited reference does not anticipate claim 32.

As amended independent claim 32 recites:

A system comprising:

an x-ray source having an emission head at a distal end of the arm assembly extending from the base unit; and

a collision avoidance subsystem coupled to the arm assembly, wherein **said collision avoidance subsystem comprises a laser rangefinder** for detecting a presence and location of said object in said one or more exclusion zones.

(emphasis added)

In particular the Office Action states:

The following is a statement of reasons for the indication of allowable subject matter.

...

As per claim 32 and dependent claim 33, the **examiner found no reference in the prior art** that disclosed or made obvious a radio-surgery X-ray system wherein the **collision avoidance subsystem comprises a laser rangefinder for detecting the presence and location of an object in one or more exclusion zones** and wherein the laser rangefinder includes: a) a transmitter for generating laser light and transmitting the laser light toward at least one of the exclusion zones, b) a receiver for receiving laser light that is generated by the

transmitter and that is back-scattered from the object, c) a photo-detector for detecting the intensity of the light received by the receiver and d) a data acquisition system effective to communicate a distance to the object by measuring a time required for the laser light to reach the object and return to the transmitter.

(Office Action, 4/18/05, pp. 6-7)(emphasis added).

Koertge merely discloses a system that **prevents collisions between the respective components** by gathering positional information from the sensors of those respective adjustable components. Nothing in Koertge, however, discloses a “collision avoidance subsystem comprises a laser rangefinder,” as recited in claim 32. Therefore, applicants respectfully submit that claim 32 is patentable over the cited reference.

Given that claims 33 and 47-49 depend from claim 32, applicants submit that claims 33 and 47-49 are also patentable over the cited reference.

Applicants respectfully submit the cited reference does not anticipate claim 50.

Claim 50 recites:

A method comprising:

defining one or more predetermined exclusion zones of a radiosurgery system, the radiosurgery system comprising an x-ray source having an emission head at a distal end of an articulated arm assembly;

detecting a presence and location of an object in the one or more predetermined exclusion zones; and

preventing the emission head from entering one or more predetermined exclusion zones.

(emphasis added)

Koertge merely discloses a system that **prevents collisions between the respective components** by gathering positional information from the sensors of those respective adjustable components. Nothing in Koertge, however, discloses a “detecting a presence and location of an object in the one or more predetermined exclusion zones,” as recited in claim 50. Therefore, applicants respectfully submit that claim 50 is patentable over the cited reference.

Given that claims 51-69 depend from claim 50, applicants submit that claims 51-69 are also patentable over the cited reference.

Applicants respectfully submit the cited reference does not anticipate claim 70.

Claim 70 recites:

A system, comprising:

 a robot positioning system having an arm assembly extending from a base unit;

 an x-ray source having an emission head at a distal end of the arm assembly to selectively emit-an x-ray beam; and

a collision avoidance subsystem coupled to the robot positioning system, wherein the collision avoidance subsystem is configured to prevent said head form entering one or more predetermined exclusion zones.

(emphasis added)

Koertge merely discloses a system that **prevents collisions between the respective components** by gathering positional information from the sensors of those respective adjustable components. Nothing in Koertge, however, discloses "**a collision avoidance subsystem coupled to [a] robot positioning system**," as recited in claim 70. Therefore, applicants respectfully submit that claim 70 is patentable over the cited reference.

Given that claims 71-75 depend from claim 70, applicants submit that claims 71-75 are also patentable over the cited reference.

35 U.S.C. § 103(a) Rejections

Claims 5-12, 19 and 23-29 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Koertge in view of Alexandrescu. Applicants respectfully submit that claim 5 is patentable over the cited references.

As amended claim 5 recites:

A system, comprising:

 an x-ray source having an emission head mounted at a distal end of an arm assembly to selectively emit-an x-ray beam;

 a collision avoidance subsystem coupled to the arm assembly to prevent the emission head and arm assembly from colliding with an object in one or more predetermined exclusion zones, the collision avoidance subsystem **comprising one or more optical emitter-receiver pairs** comprising:

an optical emitter including a light source for generating a substantially planar light beam between at least one predetermined exclusion zones and the x-ray source; and
an optical receiver for receiving back-scattered light from an object extending through the substantially planar light beam.

(emphasis added)

Koertge merely discloses a system that **prevents collisions between the respective components** by gathering positional information from the sensors of those respective adjustable components. Nothing in Koertge, however, teaches or suggests a “collision avoidance subsystem comprising one or more optical emitter-receiver pairs,” as recited in claim 5.

Alexandrescu teaches “a medical installation having an apparatus for acquiring the position of at least one object located in a room, including **a light transmitter for emitting a narrow light fan as well as a camera for acquiring the at least one object**. The signals of the camera are supplied to an evaluation unit that generates 3D data corresponding to the at least one object on the basis of these signals, the 3D data being used in order to avoid collisions of the object.” (See Alexandrescu, col. 1, lines 67 to col. 2, lines 1-2)(emphasis added). Alexandrescu further teaches utilizing an active triangular 3D technique stating, “[g]iven **a two-dimensional illumination emanating from the light transmitter 12**, for example with a light curtain or with a light fan 15, and given **a two-dimensional scanning of the room with the camera 13** that, for example, can be implemented as a video camera as video/CCD camera, highly exact 3D data with respect to the positions of the objects in the room can be acquired given a known optical base 16 between the light transmitter 12 and the camera 13 and given a known illumination angle 17.” (See col. 3, line 23-33)(emphasis added). As such, Alexandrescu merely teaches **a system having a light transmitter and a camera for acquiring images of an object**.

In contrast, claim 5 recites a “collision avoidance subsystem comprising one or more optical emitter-receiver pairs.” Nothing in Alexandrescu teaches or suggests a “collision avoidance subsystem comprising one or more optical emitter-receiver pairs,” as recited in claim 5. As such, **Alexandrescu does not cure the deficiencies of Koertge** as discussed above.

In addition, applicants respectfully submit that it would be impermissible hindsight, based on applicants' own disclosure, to combine Koertge with Alexandrescu to arrive at applicant's claimed embodiments. The Office Action states in particular part:

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Koertge such that it incorporated the collision avoidance system of Alexandrescu. One would have been motivated to make such a modification for the purpose of eliminating the need for component sensors for determining component positions thereby providing an X-ray system having a compact and simple structure as suggested by Alexandrescu (column 2, lines 1-4).

(See Office Action, 4/18/2005, pg. 4)

Here, the Office Action merely states an advantage of substituting the component sensors of Koertge for determining component positions, with the collision avoidance system of Alexandrescu, without explaining what specific understanding or technological principle within the knowledge of one of ordinary skill in the art would have suggested the combination.

Applicants submit that one of ordinary skill in the art **would not be motivated to combine** the teachings of Koertge with Alexandrescu because Koertge **explicitly teaches away** from such a combination. Applicants respectfully submit that reference cannot be combined where one reference teaches away from their combination. (See M.P.E.P. §2145.02, citing *In re Grasselli*, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983).

Koertge teaches the following:

One advantage associated with the invention is that the information about the position and current direction of motion or speed of movement of each system component is obtained directly from the drives and sensors of the component. As a result, the **entire image chain of the monitoring and collision preventing device ... is dispensed with**, which leads to an enormous simplification and reduction in costs.

...

Moreover, **because the input of the data is not carried out using cameras**, the problems associated with cameras, such as concealment or shadowing by nearby objects and persons, are avoided.

...

By limiting the information evaluated to that derived from the sensors, drives, etc., **the invention not only avoids the necessity of a very complex image evaluation system**, which would otherwise have to be connected upstream of the

neural network, as in DE 43 35 301 C1, **but also permits the use of a very much simpler neural network.**

... By arranging the inventive medical system in the manner described, direct monitoring of collisions with the patient ... is omitted from the neural network processing. **Neither an envelope curve for the patient is prescribed nor are the outlines of the patient automatically detected via an image monitoring system.** However, as a practical matter, dispensing with this feature not only results in great savings in outlay and cost but also has relatively little practical significance. One reason for this is that mutual collisions between components, which often result in considerable damage, are substantially more probable than collisions with the patient.

(See Koertge, col. 2, lines 52-59, col. 3, lines 1-4, 11-17, and 18-30)(emphasis added).

These passages show that Koertge **expressly teaches away from a system having a light transmitter and a camera or other image monitoring components for acquiring images of an object**, thus, one of ordinary skill **would not be motivated** to make such a modification “for the purpose of eliminating the need for components sensors for determining component positions thereby providing an X-ray system having a compact and simple structure as suggested by Alexandrescu,” as asserted by the Office Action.

(See Office Action, 4/18/2005, pg. 4).

Finally, even if the “light transmitter” of Alexandrescu were combined with the teachings of Koertge, such a combination would be contrary to the intended operation of Koertge. Koertge discloses “[avoiding] the necessity of a very complex image evaluation system[,]” “[leading] to an enormous simplification and reduction in costs” by dispensing with “the entire image chain of the monitoring and collision preventing device.” (See Koertge, col. 3, lines 13-14 & col. 2, lines 52-59). If the teachings of Koertge were somehow combined with Alexandrescu, the system of Koertge would become a medical system having movable components and a control device for preventing component collisions, including a image monitoring system, that **would destroy the intent of the Koertge system.** As such, one of skill in the art would not be motivated to combine the teachings of Koertge and Alexandrescu because their combination would frustrate the intent of one or both of the references.

As neither the Koertge reference nor the Alexandrescu reference, alone or in combination, teaches “collision avoidance subsystem comprising one or more optical

emitter-receiver pairs,” as recited in claim 5, the combination cannot be interpreted to teach or suggest the limitations of claim 5. Therefore, for the abovementioned reasons applicants respectfully submit that claim 5 is patentable over the cited references.

Given that claims 6-12, 19, and 35-41 depend from claim 5, applicants submit that claims 6-12, 19, and 35-41 are also patentable over the cited references.

Claims 13-15 and 30 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Koertge in view of Hinton. Applicants respectfully submit that claim 5 is patentable over the cited references.

As amended claim 13 recites:

A system, comprising:

an x-ray source having an emission head mounted at a distal end of an arm assembly to selectively emit-an x-ray beam;

a collision avoidance subsystem coupled to the arm assembly to prevent the emission head and arm assembly from colliding with an object in one or more predetermined exclusion zones, wherein said collision avoidance subsystem comprises:

an array of acoustic transducers coupled to said x-ray source, wherein each of said transducers transmits a succession of acoustic pulses along a transmission axis extending from said x-ray source, detects acoustic energy back-scattered along said transmission axis from an object disposed along said transmission axis, and **determines from said received back-scattered acoustic energy a distance between said x-ray source and said object**, and wherein the transmission axis of each acoustic transducer is mutually aligned whereby a cross-section of adjacent pairs of said pulses transverse to said transmission axis is **contiguous at a predetermined distance from said x-ray source**.

(emphasis added)

Koertge merely discloses a system that **prevents collisions between the respective components** by gathering positional information from the sensors of those respective adjustable components. Nothing in Koertge, however, teaches or suggests “**an array of acoustic transducers coupled to said x-ray source ... and determines from said received back-scattered acoustic energy a distance between said x-ray source and said object, and wherein the transmission axis of each acoustic transducers are mutually aligned whereby a cross-section of adjacent pairs of said pulses transverse to said**

transmission axis is contiguous at a predetermined distance from said x-ray source,” as recited in claim 13.

Hinton teaches a radiographic gantry with software collision avoidance for preventing “contact between moving surfaces of the instrument based on soft limits.” (See Hinton, Abstract). Hinton further teaches that, in addition to the software collision avoidance, “**one or more ultrasonic transducers 57** may be incorporated into various portions of the radiation source 44, arm 40 and detector array 50 **so as to detect a close proximity between these surfaces and another surface during control of the radiographic system 10.** For example, when the pendant 22 is used to control the radiographic system 10, signals from these ultrasonic transducers 57 received by computer 56 may be **used to augment the soft limits** obtained from the legal space table 51 **or to replace those soft limits** if there is a conflict where the ultrasonic transducer 57 indicates that a potential contact is imminent..” (See col. 12, line 47-64)(emphasis added). As such, Hinton merely teaches creating soft limits using collision avoidance software, augmented or replaced by one or more ultrasonic transducers.

In contrast, claim 13 recites a “an array of acoustic transducers coupled to said x-ray source … and determines from said received back-scattered acoustic energy a distance between said x-ray source and said object, and wherein the transmission axis of each acoustic transducers are mutually aligned whereby a cross-section of adjacent pairs of said pulses transverse to said transmission axis is contiguous at a predetermined distance from said x-ray source.” **Nothing in Hinton teaches or suggests** “an array of acoustic transducers coupled to said x-ray source … and determines from said received back-scattered acoustic energy a distance between said x-ray source and said object, and wherein the transmission axis of each acoustic transducers are mutually aligned whereby a cross-section of adjacent pairs of said pulses transverse to said transmission axis is contiguous at a predetermined distance from said x-ray source,” as recited in claim 13. As such, **Hinton does not cure the deficiencies of Koertge** as discussed above.

In addition, applicants respectfully submit that it would be impermissible hindsight, based on applicants’ own disclosure, to combine Koertge with Hinton to arrive at applicant’s claimed embodiments. The Office Action states in particular part:

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Koertge such that it incorporated the array of acoustic transducers and determining means of Hinton. One would have been motivated to make such a modification for the purpose of accurately identifying the proximity between two surfaces to avoid collision as taught by Hinton (column 12, lines 58-64).

(See Office Action, 4/18/05, pp. 5-6).

Here, the Office Action merely states an advantage of incorporating the one or more ultrasonic transducers of Hinton with the component sensors of Koertge for accurately identifying the proximity between two surfaces to avoid collision, without explaining what specific understanding or technological principle within the knowledge of one of ordinary skill in the art would have suggested the combination.

Applicants submit that one of ordinary skill in the art **would not be motivated to combine** the teachings of Koertge with Hinton because Koertge **explicitly teaches away** from such a combination. Applicants respectfully submit that reference cannot be combined where one reference teaches away from their combination. (See M.P.E.P. §2145.02, citing In re Grasselli, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983).

Koertge teaches the following:

One advantage associated with the invention is that the information about the position and current direction of motion or speed of movement of each system component is **obtained directly from the drives and sensors of the component**. As a result, the **entire image chain of the monitoring and collision preventing device ... is dispensed with**, which leads to an enormous simplification and reduction in costs.

...
Moreover, **because the input of the data is not carried out using cameras**, the problems associated with cameras, such as concealment or shadowing by nearby objects and persons, are avoided.

...
By limiting the information evaluated to that derived from the sensors, drives, etc., **the invention not only avoids the necessity of a very complex image evaluation system**, which would otherwise have to be connected upstream of the neural network, as in DE 43 35 301 C1, **but also permits the use of a very much simpler neural network**.

...
By arranging the inventive medical system in the manner described, direct monitoring of collisions with the patient ... is omitted from the neural network processing. **Neither an envelope curve for the patient is prescribed nor are the**

outlines of the patient automatically detected via an image monitoring system. However, as a practical matter, dispensing with this feature not only results in great savings in outlay and cost but also has relatively little practical significance. **One reason for this is that mutual collisions between components, which often result in considerable damage, are substantially more probable than collisions with the patient.**

(See Koertge, col. 2, lines 52-59, col. 3, lines 1-4, 11-17, and 18-30)(emphasis added).

These passages show that Koertge **expressly teaches away from a collision avoidance system having ultrasonic transducers for detecting a close proximity of objects**, thus, one of ordinary skill **would not be motivated** to make such a modification “for the purpose of accurately identifying the proximity between two surfaces to avoid collision as taught by Hinton,” as asserted by the Office Action. (See Office Action, 4/18/2005, pg. 4).

Finally, even if the “ultrasonic transducer” of Hinton were combined with the teachings of Koertge, such a combination would be contrary to the intended operation of Koertge. Koertge discloses “[avoiding] the necessity of a **very complex image evaluation system[.]**” “[leading] to an enormous simplification and reduction in costs” by **dispensing with “the entire image chain of the monitoring and collision preventing device.”** (See Koertge, col. 3, lines 13-14 & col. 2, lines 52-59)(emphasis added). If the teachings of Koertge were somehow combined with Hinton, the system of Koertge would become a medical system having movable components and a control device for preventing component collisions, including an ultrasonic monitoring system, that **would destroy the intent of the Koertge system.** As such, one of skill in the art would not be motivated to combine the teachings of Koertge and Hinton because their combination would frustrate the intent of one or both of the references.

As neither the Koertge reference nor the Hinton reference, alone or in combination, teaches “an array of acoustic transducers coupled to said x-ray source ... and determines from said received back-scattered acoustic energy a distance between said x-ray source and said object, and wherein the transmission axis of each acoustic transducers are mutually aligned whereby a cross-section of adjacent pairs of said pulses transverse to said transmission axis is contiguous at a predetermined distance from said x-ray source,” as recited in claim 13, the combination cannot be interpreted to teach or

suggest the limitations of claim13. Therefore, for the abovementioned reasons applicants respectfully submit that claim 13 is patentable over the cited references.

Given that claims 14-15, 31, and 42-45 depend from claim 13, applicants submit that claims 14-15, 31, and 42-45 are also patentable over the cited references.

Claim Objections

Claims 6, 7, 13, 19 and 31 have been objected to because of informalities. In particular, the Office Action states:

Claim 6, line 1 recites: “ said planar light beam. “ Examiner notes there is no antecedent basis for the use of this term. Dependent claim 7 is similarly objected to.

Claim 13, line 6 recites. “ said light axis. “ Examiner notes there is no antecedent basis for the use of this term (see also claim 31, line 10 “the distance”, line 11, “the time”).

Claim 19, lines 1-2 recite. “ wherein said one or more light sources form a linear array of light sources.” Examiner notes that the condition of one light source fails to satisfy the limitation of forming a linear array of light sources.

The claims have not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant’s cooperation is requested in correcting any errors of which applicant may become aware in the claims.

Appropriate correction is required.

(Office Action, 4/18/05, p. 2).

Applicants respectfully submit that, as amended, claims 6, 13, and 19 overcome the objection to informalities. Therefore, applicants request that the objections to claims 6, 13, and 19 be withdrawn.

Claims 31-34 have been objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicants submit that claim 32 has been rewritten in independent form to include all of the limitations of the base claim and any intervening claims. Therefore, applicants submit that claim 32 is in condition for allowance.

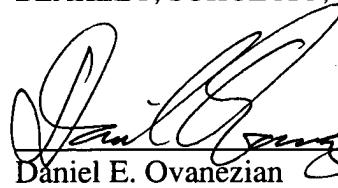
Given that claims 33 and 47-49 depend from claim 32, applicants submit that claims 33 and 47-49 are also patentable over the cited references.

In conclusion, applicants respectfully submit that in view of the arguments [and amendments] set forth herein, the applicable objections and rejections have been overcome.

If the Examiner believes a telephone interview would expedite the prosecution of this application, the Examiner is invited to contact Dan Ovanezian at (408) 720-8300. If there are any additional charges, please charge our Deposit Account No. 02-2666.

Respectfully submitted,

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